SIEMENS

ISMAI: Dia da Energia | May 29th , 2015 | Filipe Rodrigues

A Energética nos Edifícios de Serviços

A eficiência energética em edifícios é a resposta. Qual é a pergunta?

Table of content

What influences the market?

Growing of population

By 2025: World population will grow from more than 6 billion now to 8 billion.

Urbanization

By 2030: 60% of the world's population will live in cities.

Care for the environment

Today we face the **highest CO^2 concentration** for the past 350,000 years.

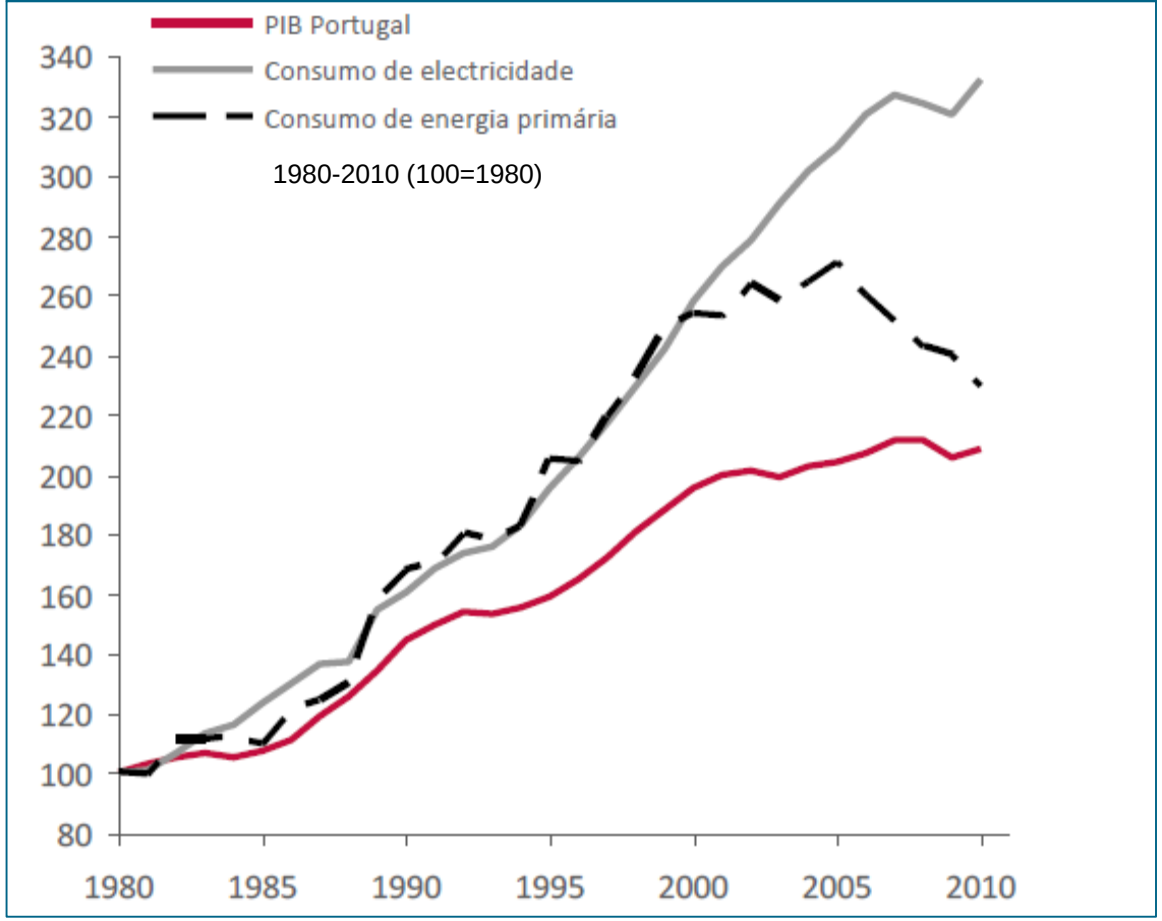
Scarcity of resources

50% of the world‘s population consume **75%** of the energy.

- The need of protection of critical infrastructure is increasing.
- The requirements concerning the security of life and property are constantly increasing.
- The consumption of energy and the CO_2-emissions have to be reduced dramatically.
- Comfortable working and living conditions are increasingly required.

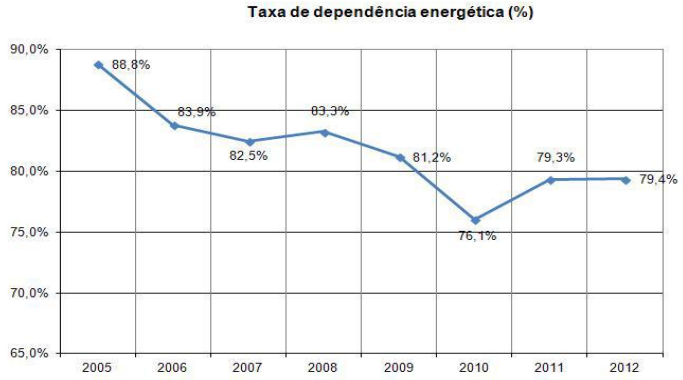
Portuguese Energy Characterization

The Energy Consumption and GDP Evolution

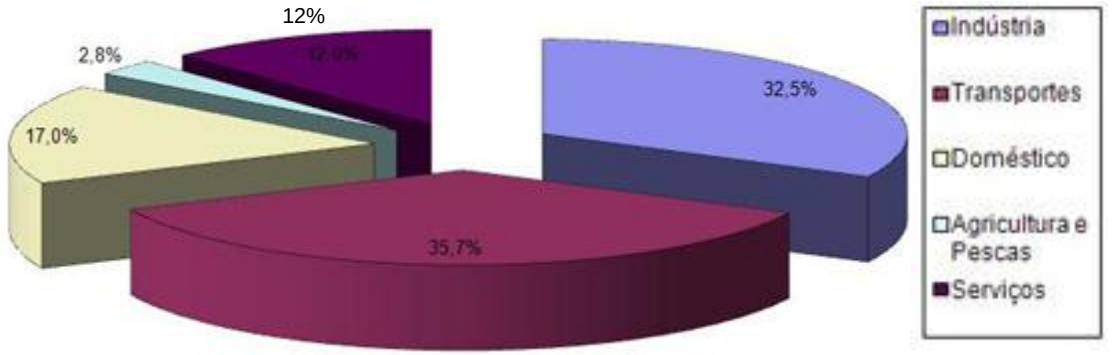


Fonte: International Monetary Fund, World Economic Outlook Database, April 2012; The World Bank - World Development Indicators & Global Development Finance, DGEG

Energy Dependency



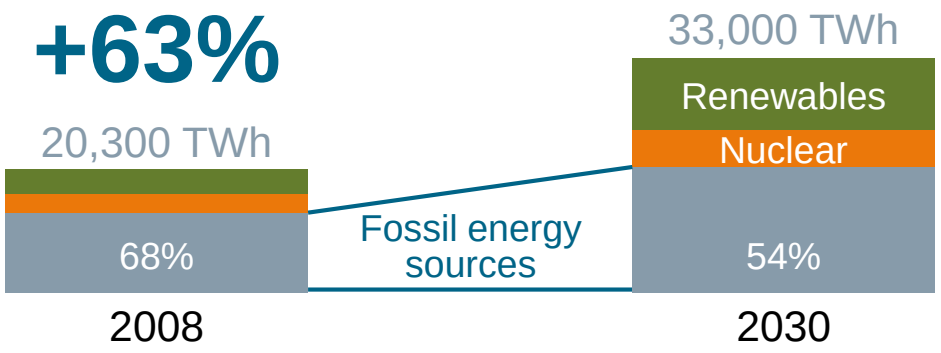
Final Energy Consumption by Sector 2012 (%)



Fonte: DGEG, "Caraterização Energética Nacional 2012", 2014

Future energy challenges

Growing demand



High share of renewable energy

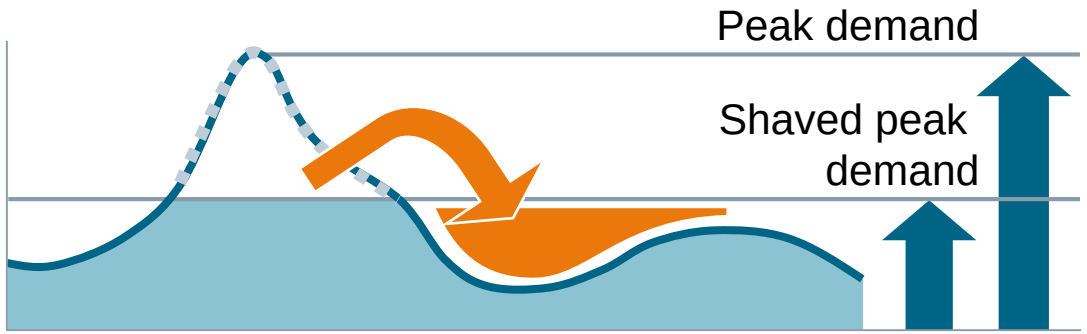
20% **2020**

EU-Directive for renewable energy

- **Hydro**
- **Wind**
- **Solar**
- **Geothermal**
- **Biomass**

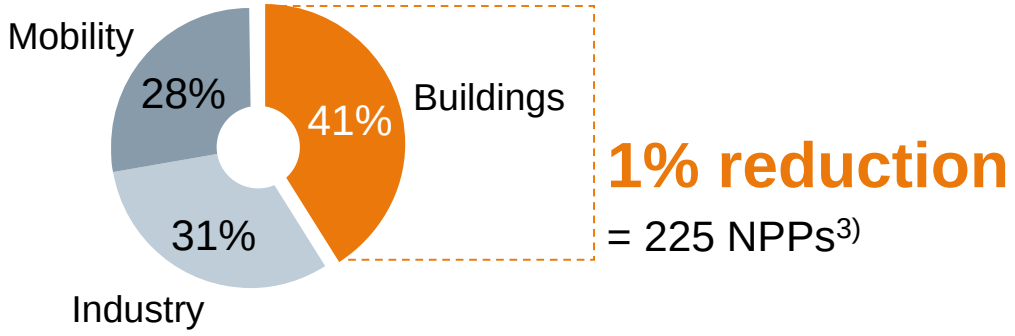
Decentralized energy production

Stochastic energy flow

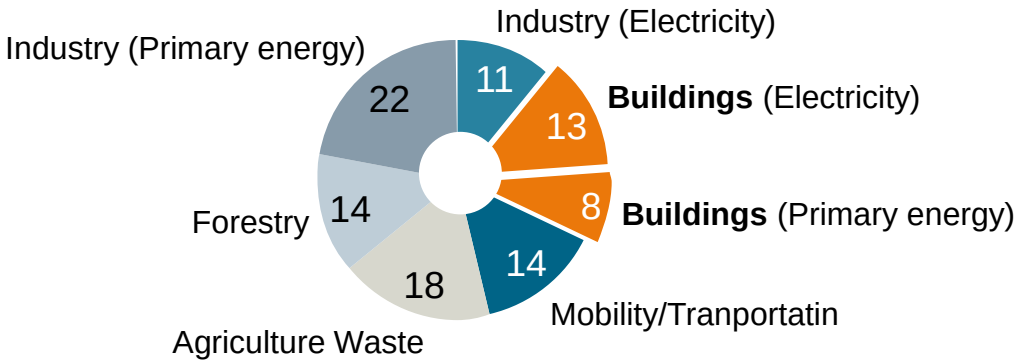


Buildings: Energy challenge and untapped energy savings potential

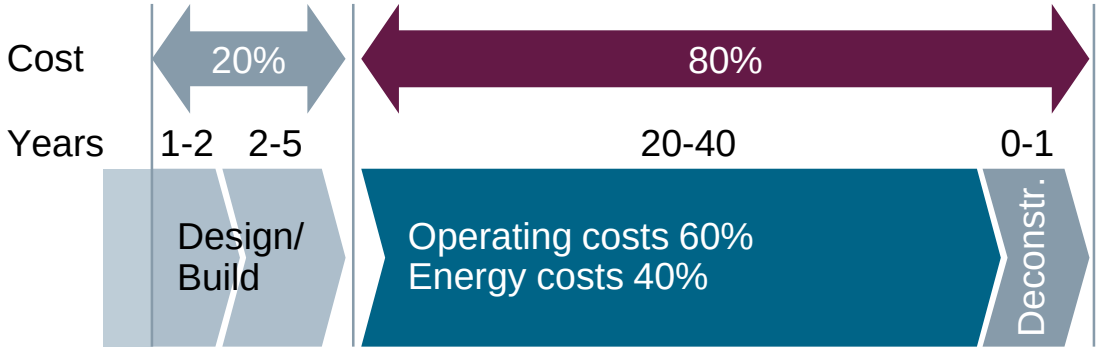
41% of world wide energy consumption[1)]



21% of the global green house gas emissions[3)]



Energy accounts for 40% of the building operation cost[2)]



Smart Buildings are highly energy efficient

- Demand response
- Lower energy consumption

1) International Energy Association, auf weltweiter Basis, im Jahr 2002
2) Dena Congress, Berlin, 2008

3) Based on predicted energy demand of 33'000 TWh (2030) and average NNP output of 6TWh

Table of content

Smart Grid with Smart Buildings are the solution to mitigate future energy challenges

SIEMENS

Generation follows demand

Demand follows generation

Role of buildings

- Consumer

- Demand response
- Co-generation
- Storage
- Intelligent consumption

Table of content

Grid and building have entered the development phase of becoming "smart"

Evolution of grid and building

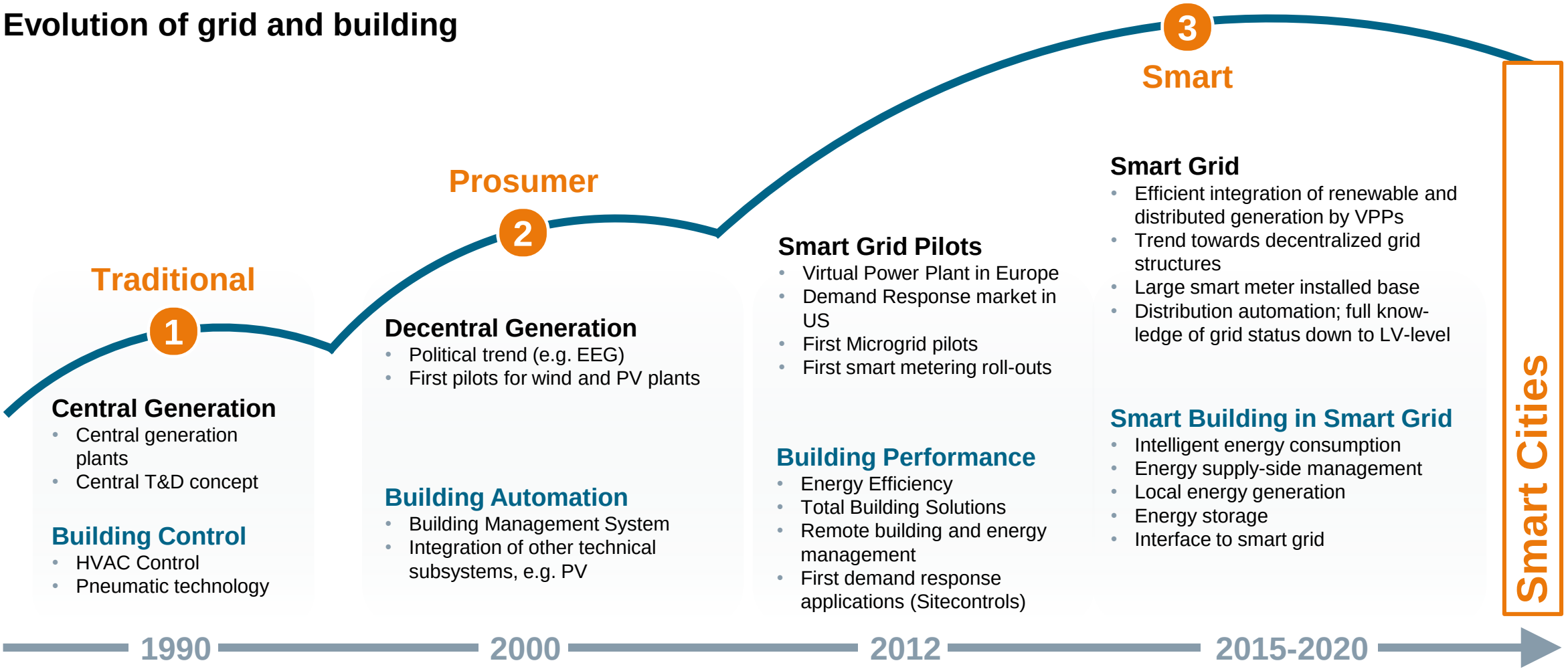
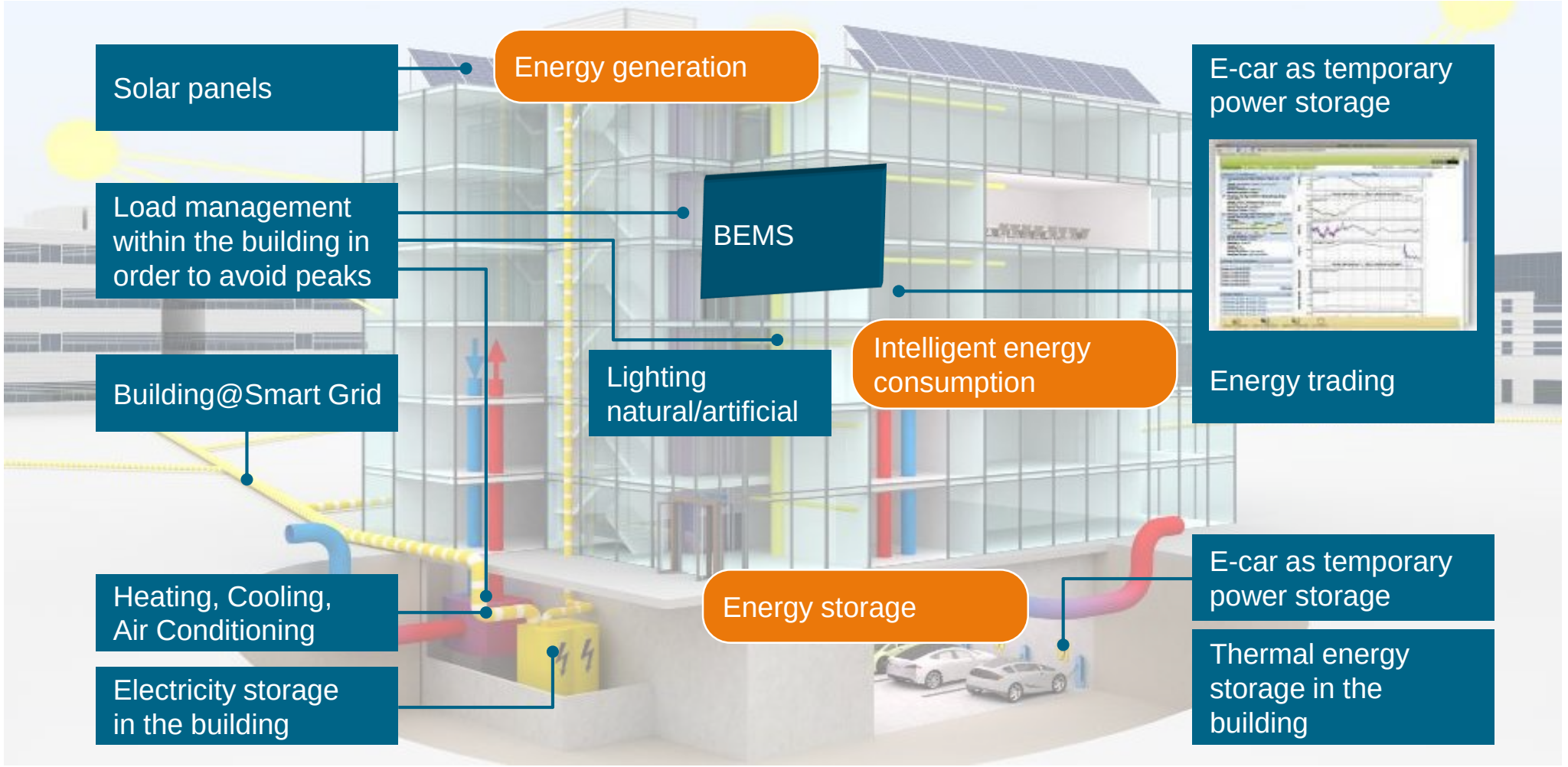


Table of content

Functions of Smart Buildings in Smart Grids



Source: BT BAU BEMS: Building Energy Management System

Value of a Smart Building in a Smart City

- Peak load reduction
- Load shifting
- Co-generation/storage
- Cost and CO_2 reduction
- Optimized network planning
- Energy consumption optimization
- Integration of renewable energy
- E-mobility charging

Building Efficiency

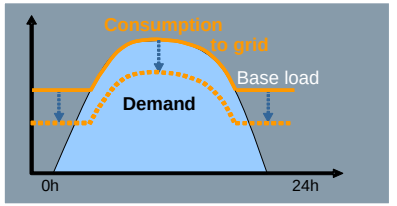
- Building management
- Monitoring, controlling and forecast, load management
- HVAC, Lighting
- Integration of solar, electrical/thermal storage
- Grid gateway

Table of content

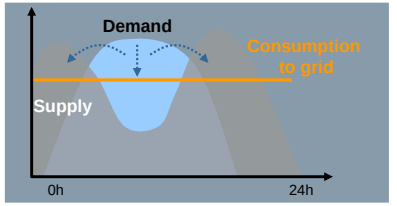
Smart Buildings manage optimally local consumption, generation and storage, by providing detailed monitoring

Building Energy Management System (BEMS)

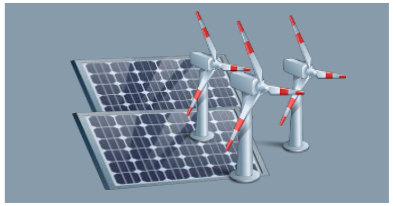
Shaping
Reduce consumption



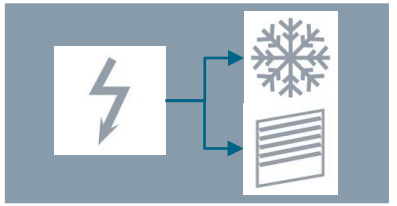
Shifting/Balancing
Shift consumption to low tariff to reduce peak load



Co-Generation
Use CHP, PV or other Power Supply for Co-generation



Energy Portfolio Management
Replace one energy source by a more cost-competitive alternative



Smart Buildings manage optimally local consumption, generation and storage, by providing detailed monitoring

Smart Building

Energy Efficiency
Reduced energy consumption at highest comfort, improved sustainability

Smart Building
Total building solution including local generation, local storage, power management & e-mobility

Monitoring, Controlling and Forecast
Detailed monitoring and forecast about building's processes

Application examples

- Heat generation with heat pump
- Air distribution
- Temperature control with blinds
- Brightness control with lighting

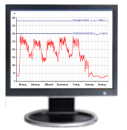
- Communication with smart grid
- Energy generation and storage
- Optimal management of generation, consumption and storage, incl. e-mobility

- Interpretation of monitored data
- Forecast for consumption, generation, storage
- Building transparency

0 Monitoring, Forecast

1 Smart Building products

2 Building Mgmt. System



3 Energy efficient solutions and services

Monitoring rollout → Building certificate portfolio analysis → Detailed analysis building check → Define best solution → Appropriate financing concept → Realization → WWW → Implemen-tation metering → Specification baseline

Building Life Cycle Management

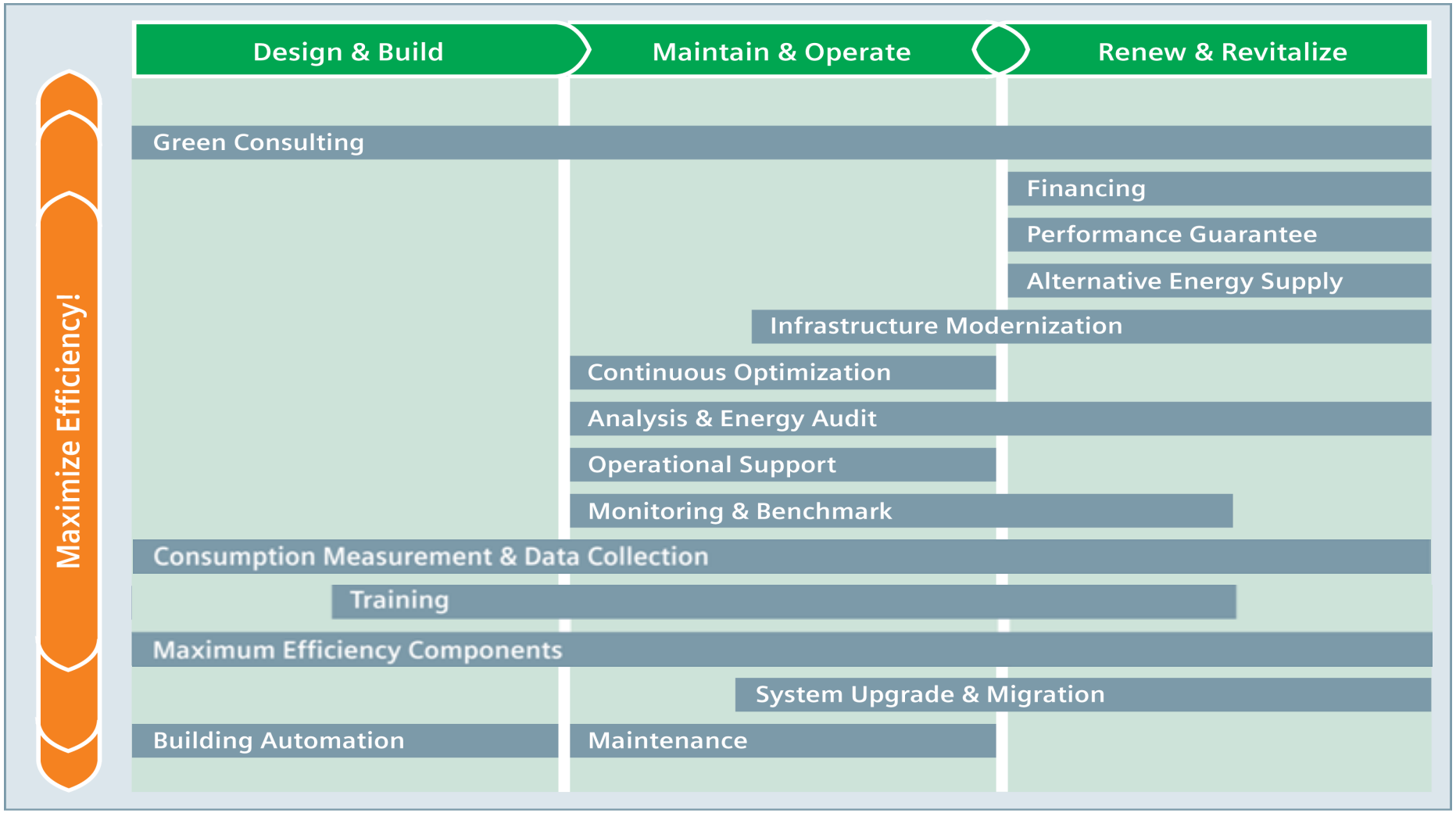


Table of content

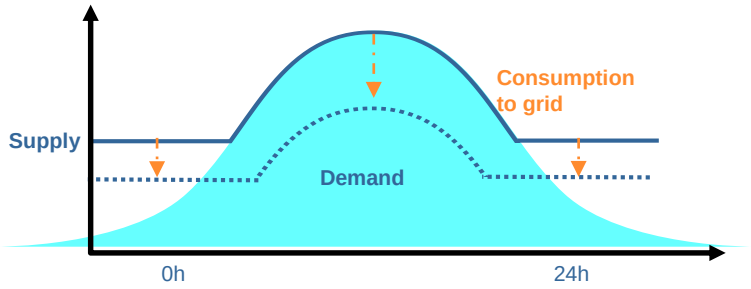
- Future Energy Challenges
- Solution: Smart Buildings in Smart Grids
- Evolution of Grid and Buildings towards "Smart"
- Role and Value of Smart Buildings in Smart Grids
- Technical aspects of Smart Buildings in Smart Grids
- **Financial aspects of Smart Buildings in Smart Grids**
- Smart Buildings in Smart Grids: competitive advantage for cities
- Q&A

Smart Buildings in Smart Grids are driven by:

Reduced KWh consumed

Savings of 20% to 40% yet achieved

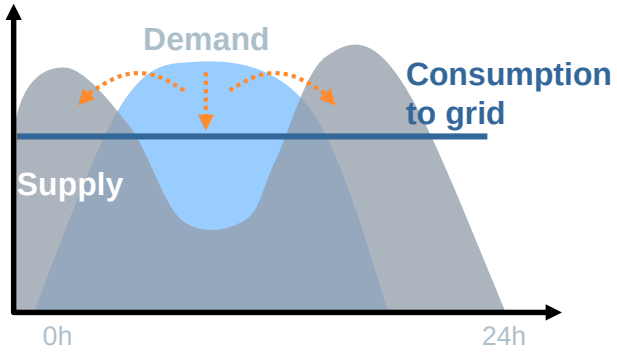
Reduce demand and peak load



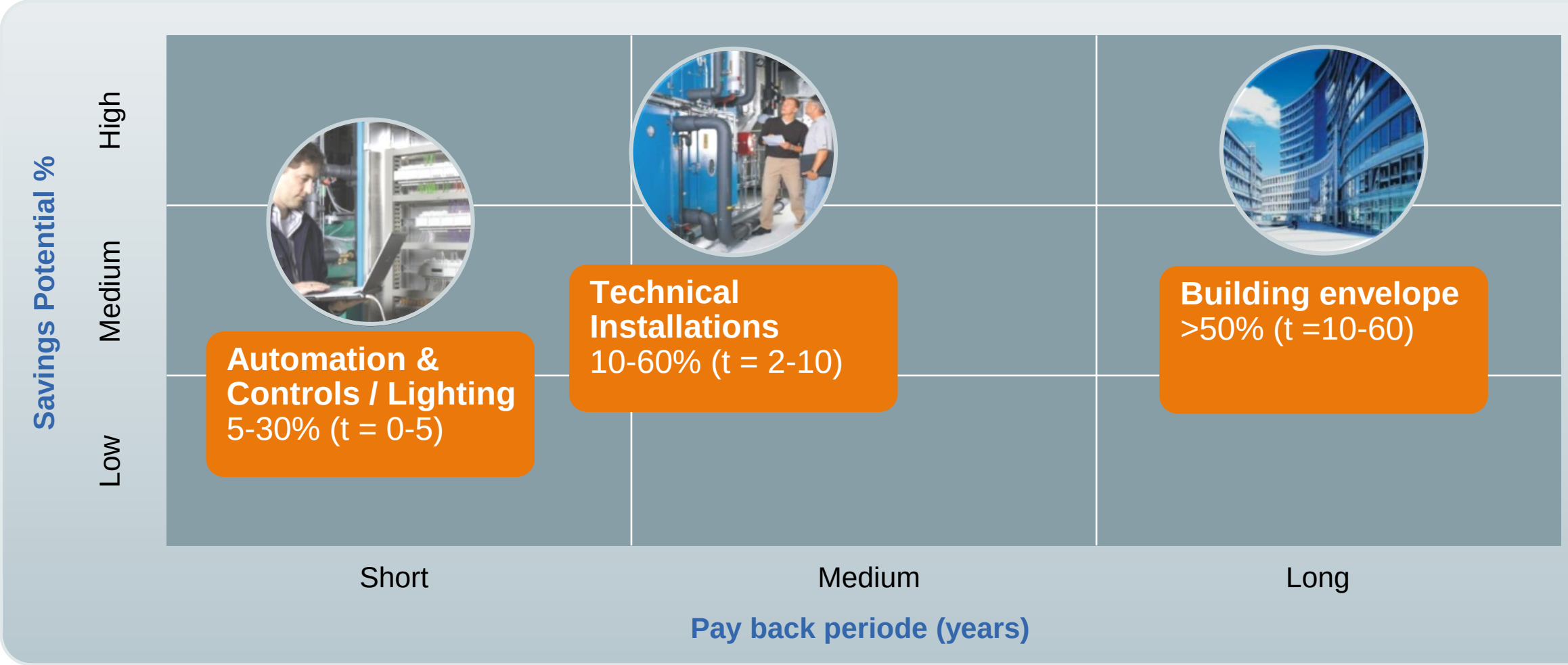
Balancing the grid to:

Savings of 10 % to 20 % energy costs possible

Shed, shape and shift demand

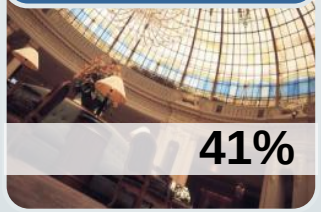
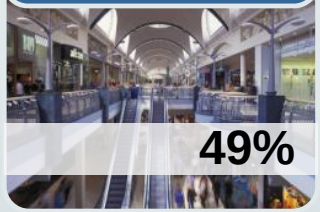


Investment in sustainability and ROI are closely connected



Smart investments in efficiency achieve numerous financial, environmental, and efficiency benefits

SIEMENS

Hospital	Office	Residential	Restaurant	Hotel	Shopping Ctr	School
						
26%	26%	27%	41%	41%	49%	52%

Energy savings are possible, in every building – in every business 20% to 40% is realistic!

Value of efficient buildings

- Green Buildings are 0-5% more expensive to build
- Energy efficiency ~25% - 35% vs. traditional construction
- ROI for building owners can be significant

Financial benefits

- Overall, 6% higher rental rates
- 16% higher selling price
- Higher occupancy

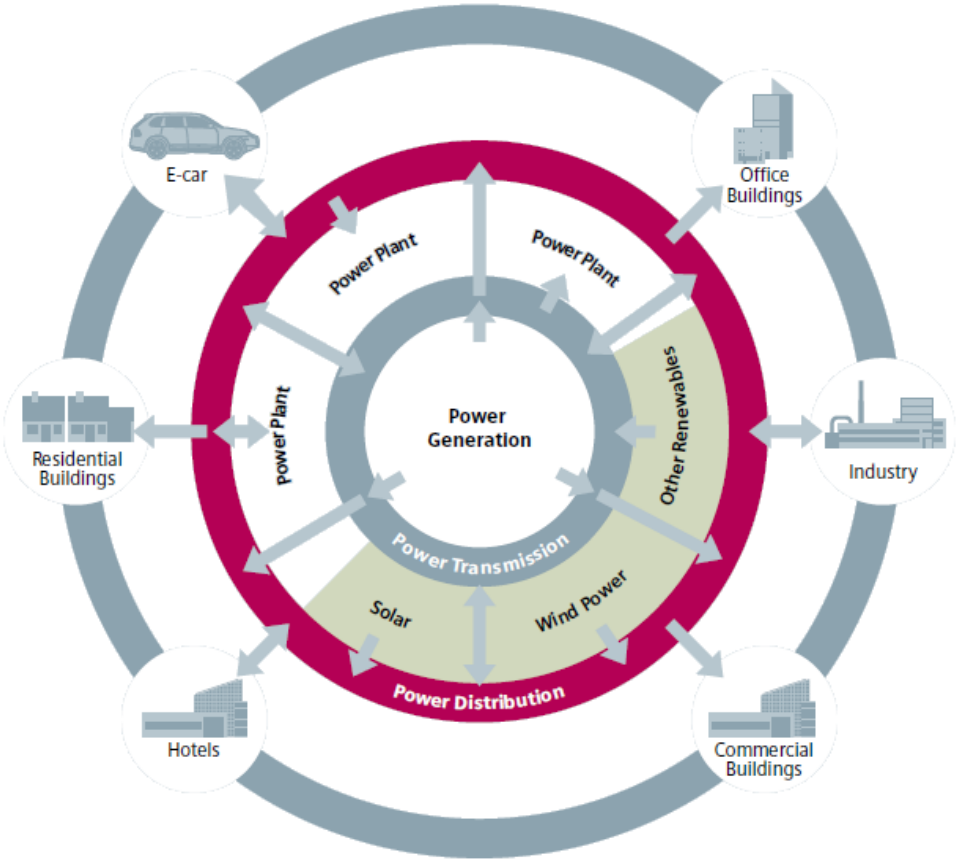
Table of content

With Smart Buildings in Smart Grids towards Smart Cities

Smart Building

Smart Buildings communicate and integrate with the Smart Grid

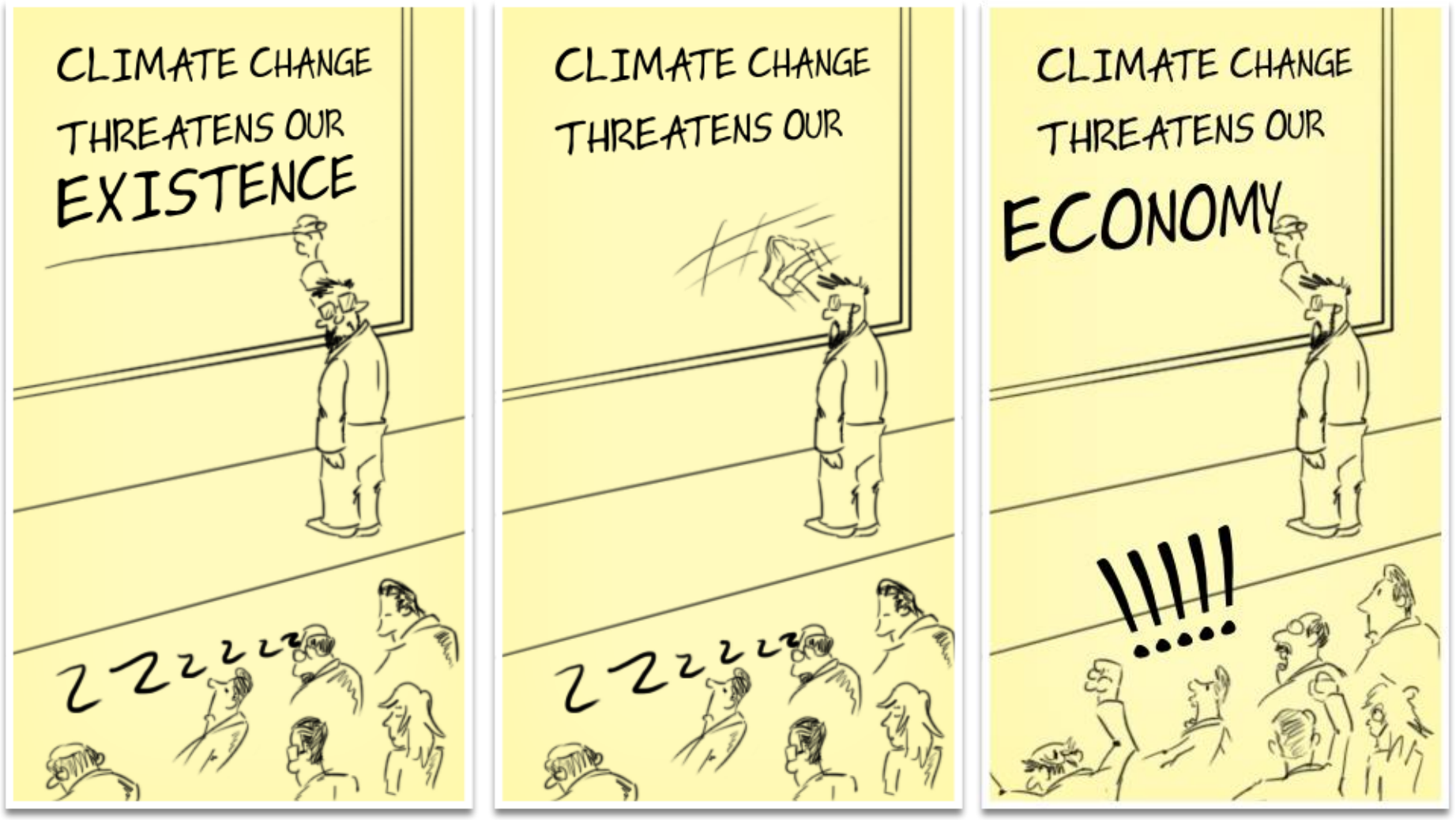
Smart Grid



Smart Cities

Together with the Smart Grid, Smart Buildings form the basis for a Smart City

The Environmental Conscience and Economic Development



How Smart Buildings in Smart Grids will boost the competitiveness of smart cities

SIEMENS

Economical Aspects

- Cost reduction through energy and operational efficiency
- Increase of building's value
- Attractiveness for companies
- Avoidance of costly grid infrastructure investments

Social Aspects

- Positive image
- Increased productivity
- Security/healthy life conditions
- Attract highly qualified workforce

Environmental Aspects

- Optimized use of resources
- Efficient use of renewable energies
- Reduction of green house gases
- Foundation for sustainbable e-mobility

Open boundaries/ challenges

- Regulatory & Legislative framework
- Sufficient potential in energy markets for marketing flexibility
- Load flexibility potential of commercial buildings
- Time and load dependent pricing spread
- Customers complexity
- Standardization and protocols
- IT security

What is the Questions ?

Something that is **universally accepted** as the discussions on energy …

… energy efficiency is the most cost effective choice in economic, environmental perspective and risk reduction

Contact page

Filipe Rodrigues
BuildingTechnologies

Siemens S.A.

Rua Irmãos Siemens, nº 1
2720-019 Amadora

Tel: +351 968 689 004

E-mail: filipe.rodrigues.ext@siemens.com

siemens.com/answers

SIEMENS

SIEMENS

Thank your for your attention!

Questions and answers